1 June 1900

NATIONAL PATENT

WOOD PRESERVING COMPANY.

ORGANIZED UNDER THE LAWS OF THE STATE OF NEW YORK.

Capital Stock, . . $1,000,000.

Divided into 10,000 Shares of $100 Each;

1000 SHARES—$100,000 WORKING CAPITAL.

OFFICERS.

J. RICHARD BARRET, - - - *President.*
HENRY STEERS, - - - - - *Vice-President.*
I. C. WOODS, - - - - - *Secretary.*
EUGENE KELLY, (No. 24 Nassau Street, New York,) *Treasurer.*

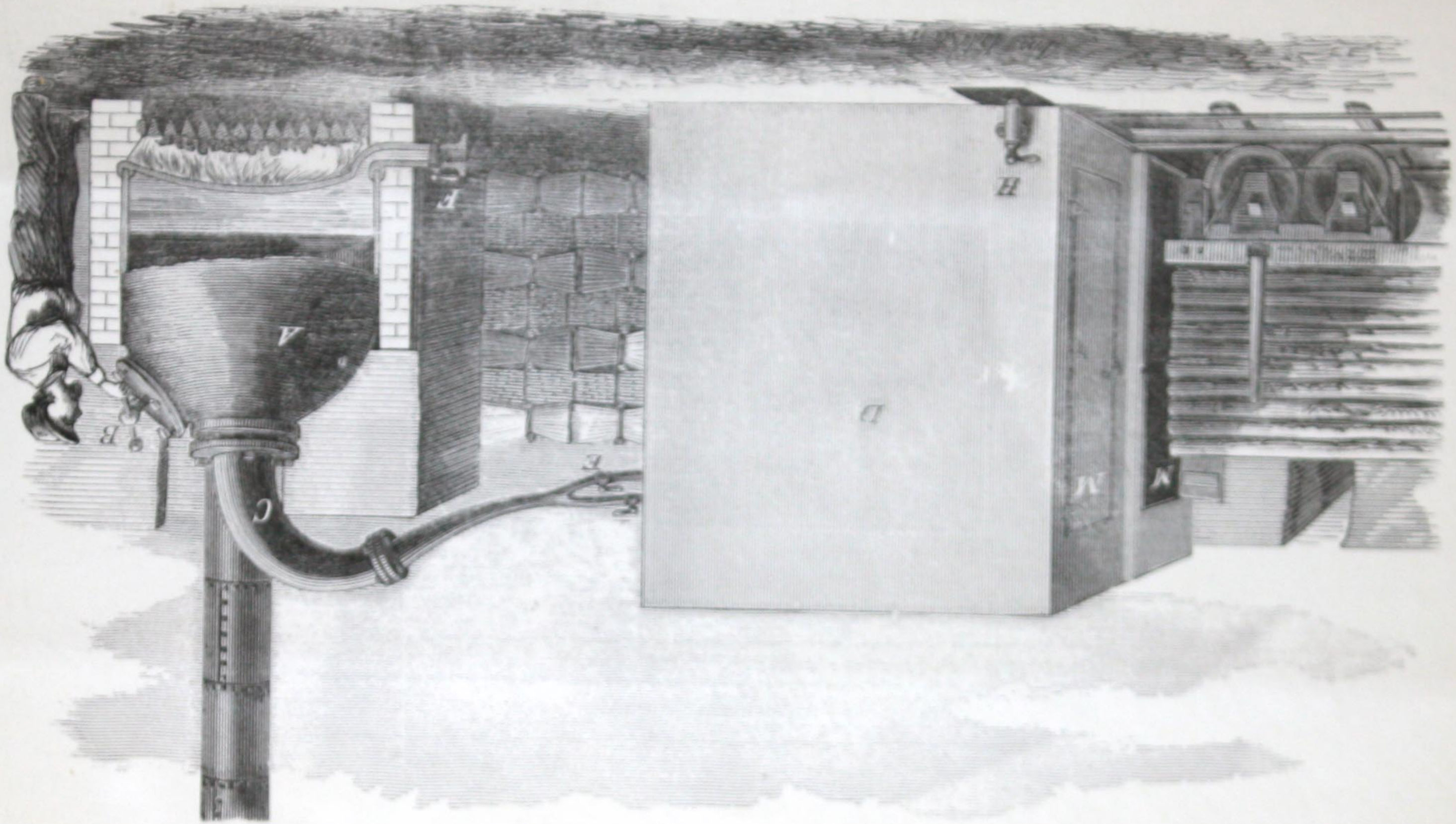
NEW YORK:

OFFICE—No. 68 BROADWAY,

ROOMS 11, 12 & 13.

1866.

EDWARD O. JENKINS, PRINTER, 20 NORTH WILLIAM STREET, NEW YORK.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ANNOUNCEMENT.

THE NATIONAL PATENT WOOD PRESERVING COMPANY, having purchased the new Invention for Preserving Wood, patented by LOUIS S. ROBBINS, is now prepared to use, and to sell the right to use, said Invention in Towns, Cities, Counties and States, to individuals, to Railroad Companies and other Corporations. All applications to the Company will receive immediate attention.

J. RICHARD BARRET, President,
HENRY STEERS, Vice-President,
I. C. WOODS, Secretary,
} *Executive Committee.*

S. B. BRITTAN, General Agent.

OFFICE OF COMPANY,
68 *Broadway, New York.*
Sept. 1st, 1866.

ART OF PRESERVING WOOD.

THE importance of preserving wood for mechanical purposes can no longer be questioned. Timber, conveniently located—within a reasonable distance of the chief centers of the lumber trade—must soon be exhausted. We shall, ere long, be obliged to draw our supplies from situations remote from the main channels of water communication—from the gradual slopes and steep acclivities of the great mountain ranges which traverse the continent. When the country along the chief lines of railway shall also have been stripped of such building materials, we shall be compelled to look to other, still more distant, and comparatively inaccessible regions for what we require; and from such sources it will only be obtained by great labor and at a heavy expense. A very large portion of the country embraced within the geographical limits of the new States and Territories, is, even now, very poorly supplied with wood. In Nevada a single railroad sleeper is worth double the average price in the Eastern and Middle States. A rough knotty stick, five feet long and one foot in diameter—only fit to prop up the roof of a mine—is worth *one dollar in gold*. The rapid settlement of that country, and of the whole Pacific side of the continent, will soon render wood, of all the materials employed in the useful arts, the most difficult to be obtained.

But the world scarcely realizes the existence of a great

and general demand before it is supplied. The resources of Nature, the triumphs of the human mind, and the order of Providence, all combine to meet the chief necessities of every age. Perhaps no more important discovery has been made, in the department of the useful arts, than the new process of preserving wood, for which Mr. Louis S. Robbins has received Letters Patent. The metallic compounds employed by several European inventors had all substantially failed. To say the least, the processes were all expensive, the machinery imperfect, and the results unsatisfactory. The process of Mr. Bethell, of England, has been employed with far greater success than any other, especially in the preparation of railroad sleepers. He rejected the metallic solutions, and in their stead used an oleaginous compound obtained from coal tar. The means he employed to remove the atmospheric pressure and the moisture from the wood—to the end that the oily compound might be made to permeate its substance—were expensive and only partially effectual. In Mr. Robbins' process the high temperature and the vapors of oil remove the air and moisture so effectually that the wood readily receives the liquid oil longitudinally through all its pores. When heavy timber is to be prepared, it is not necessary that the oil should penetrate to the center. To facilitate the process in such cases, and to economize time and material, the oil may be applied in liquid form, after the hot vapors have expelled the moisture, and the albumen of the sap has been completely coagulated by the application of heat and the introduction of the creosote in the vapor. The superior advantages of this process may be briefly stated as follows:

1. The hot vapors immediately force out a large portion of the air from the chamber; the surface moisture is dissipated and the wood sufficiently seasoned.

2. The materials used in the process are so expanded by heat as to fill more than 1,000 times the space they occupy in the liquid state. Being rendered thus subtile and penetrating, the elements essential to the result are readily admitted into the smallest pores of the wood.

3. The heat accelerates the capillary action or molecular attraction; and hence the antiseptic matter is conveyed more speedily and fully through the fibrous portions of the wood.

4. The apparatus is simplified; and, for the reasons already stated, the process is rendered more rapid and complete.

5. The wood treated by this process is left *clean* on the surface, and may be freely handled and immediately used for any purpose.

6. If designed for out-buildings, fences, agricultural implements, or any other purpose in which ornament is not an object, the wood requires no paint, but where paint is to be used, the wood is most thoroughly prepared to receive it, being already primed in the most perfect manner.

7. The wood in which the pores are largest, and the ligneous fiber least compact, is rendered nearly as hard and quite as imperishable as the finest grained timber.

8. The very nature of the materials with which the wood is impregnated, naturally renders it impervious to moisture; and experience has already demonstrated that wood so prepared is comparatively imperishable.

9. Neither science nor extraordinary skill is required in conducting the process, and the most perfect treatment under the patent involves but a trifling expense.

In situations where it is constantly exposed to varying degrees of temperature and moisture, wood decays in a short time. The sills and sleepers of buildings, in moist

places, with little or no circulation of air beneath ; the fence posts set in the ground, and railroad ties, seldom last over five years. The decay of timber employed for these purposes is immense, so great, indeed, as to defy computation. In the few cases which admit of accurate estimates the facts are surprising, and fully justify the conclusion, that the actual loss to the country by the decay of wood—in all the various uses for which it is employed in the mechanic arts—must amount to thousands of millions of dollars every year. It is true that in many places, and for many uses, wood does not decay so rapidly as in the particular cases already named; still, if we could arrest this universal process of decay, but for one year, we should doubtless save enough to cancel the present national debt.

The reader's attention may now be called to a more specific statement of some of the particular uses to which this process for preserving wood may be applied with the greatest advantage.

RAILROADS.

In respect to the timber used for sleepers, we can determine the annual waste, by the ordinary process of decay, with considerable precision. It requires 2,500 ties or sleepers for a single mile of railway. These are furnished at an average cost of one dollar, including the expense of laying down the same. As they must be renewed as often as once in five years, it will be perceived that the annual decay is at the rate of twenty per centum on the original cost; or, annually, $500 per mile. The 50,000 miles of railtracks, now in the United States, necessarily require for their support 125,000,000 of sleepers. These must inevitably be replaced, once in about five years, at a cost of one dollar each; hence it will be percieved, that the annual ex-

penditure for this purpose is some 25,000,000 of dollars. As the Robbin's process is sure to preserve them for a quarter of a century, and thereby render it unnecessary to change them during all that period, it follows that this immense sum (less the cost of the original treatment under the patent) may be annually saved to the country. For the local structures—depot buildings, store houses, machine shops, bridges (the latter need not be covered), and the immense rolling-stock of our great railways, this process is scarcely less valuable, and its application to these uses must greatly increase the dividends of our railroad corporations. When the woodwork of the cars is otherwise completed, it may be readily subjected to this treatment; and thus the same process will thoroughly season the wood, fill the pores and fibrous portions with powerful antiseptics, and cover the surface far more effectually than any priming known to the painter, leaving it in the most perfect condition to receive an ornamental finish of paint and varnish when that is required.

But we have not yet fully estimated the evil of the present rapid decay. In the course of three years after the construction of a railroad the ties begin to decay so rapidly, that it becomes necessary to remove a greater or less number of the same in every succeeding year. This frequently obstructs travel and delays the transportation of merchandise over the road Moreover, the repairs of necessity disturb the bed on which the sleepers rest, and whatever unsettles the foundations of portions of the road is liable to render it less secure as a whole, and the chances that accidents will occur are indefinitely multiplied.

AGRICULTURAL IMPLEMENTS.

The Agricultural interest is the one upon which the true

wealth of nations primarily and chiefly depends; it follows, therefore, that a vast amount of capital is necessarily invested in the implements of husbandry. The inevitable exposure of these to all the vicissitudes of temperature and moisture in a short time renders them useless. If they do not immediately decay, the vitality and elasticity of the wood are soon destroyed, so that it is easily broken. The process here offered to the public affords a sure protection against the destructive effects of oxygen and moisture, and thus preserves such implements until they are literally worn out by attrition.

BARRELS AND CISTERNS.

We annually require millions of barrels, casks of various sizes, and large cisterns for the spirits and oils of every possible description, and all the liquid products of our manifold industry. These barrels are now made from seasoned timber, making it necessary for the manufacturer to invest a large amount of capital in the quantity which must be kept on hand; besides the timber is liable to be damaged for such purposes—while it is being seasoned—by small worms that bore through it in all directions. Green timber can be employed for this purpose, provided it be first treated by Mr. Robbins' process. This offers an advantage which will be readily appreciated by every barrel manufacturer. A very large proportion of the packages intended for transportation, both in our domestic trade and foreign commerce, are put up in this form; and the contents of such packages probably represent more than one-fourth of the market value of the elements that enter into the commerce of the world. The certain exposure of such packages to all the changes of temperature and degrees of

moisture results in an incalculable waste of valuable merchandise. Hence, all the wood employed for such purposes should be so prepared, that it will effectually resist the ordinary action of the elements.

BRIDGES, PIERS AND WHARVES.

The application of the Robbins process to the lumber employed in the construction of these works, is of great practical importance. Such superstructures are necessarily among the most expensive within the whole range of mechanical art. But the cost of bridges may even be diminished, if the materials are first subjected to this treatment, for the reason that they require no covering to protect them from the elements; the expense of the roof and enclosure being entirely saved.

But our estimate of the importance of a proper preparation of the lumber used for such purposes is not to be determined by merely commercial or financial considerations. In respect to bridges, at least, it intimately concerns the *safety* of the whole community. Without such a preparation, the piles and other timbers used in the construction of bridges soon decay; besides they may be weakened by insects that bore them beneath and above the surface of the water. The treatment here proposed, not only preserves the whole structure from decay, but it also protects it from the naval worm and the parasitic fungi, which produce the dry rot.

HOUSES AND OUT-BUILDINGS.

In our own country the dwellings of 25,000,000 of people are chiefly made of wood; and in the world there may be 600,000,000 who dwell in wooden habitations. A still larger proportion of all out-buildings are of such perishable

materials, especially the shingles so generally used for covering the roofs, and which should always be treated in the manner herein proposed. No reliable estimate can ever be formed of the loss to the world by the decay of buildings. Not only the materials perish, but all the labor expended in fashioning the same into the innumerable forms of use and beauty is likewise lost. The proposed treatment of lumber for such purposes, besides saving the priming coat of paint in all cases, would so increase its durability, that a large portion of the labor now expended in erecting human habitations and other structures of wood, could be at once directed into other profitable channels, thus augmenting the wealth of all civilized nations.

FENCES.

The preparation of fencing materials certainly suggests one of the most important uses to which the new process for preserving wood can be applied. Some years since, Mr. John S. Skinner, while editing the *Plow, Loom and Anvil*, after a painstaking investigation of the subject, prepared and published a series of papers in which he is led to conclude—from all the information in his possession—that the setting and repairing the fences of the United States actually cost the country as much as the building of the towns and cities. Especially in those portions of the Union where the people are obliged to use sawed lumber—obtained from a distance, as in Illinois and other parts of the great West—this process of treating wood must be of incalculable value, as fences so prepared and properly set will last for generations.

CARRIAGES AND CARS.

The process here offered is also important in the preparation of lumber for vehicles of every description. Millions

of dollars are invested in this business, and this treatment, especially as applied to the hubs of carriages, is of great practical utility. Without it the hubs soon check or crack in such a manner as to loosen the spokes, and thereby destroy the integrity of the whole wheel. Moreover, the timber chiefly used for hubs is that part of the trunk nearest the ground, the portions further removed from the root being too soft for that purpose; but this treatment renders the higher portions of the tree, if otherwise suitable, not less valuable for this particular purpose.

FURNITURE AND MUSICAL INSTRUMENTS.

The utility of applying this treatment to furniture and the cases of musical instruments will be obvious on a moment's reflection. 1. Green wood may be used, thus obviating the necessity for the investment of a large capital in lumber. 2. The varying degrees of moisture will not cause the wood so treated to alternately swell and shrink. 3. Its tendency to warp and crack is greatly diminished. 4. The wood—both surface and substance—is most effectually oiled. 5. Soft woods are rendered much harder than before, and hence susceptible of a higher polish. 6. The wood becomes more resonant by this treatment, which is important if it is to be used for the cases of organs, pianofortes and melodeons.

PLANK ROADS AND WOOD PAVEMENTS.

The chief objection to plank roads and wood pavements is based upon their sure and rapid decay, and the necessity —after two or three years—for constant repairs. The treatment of wood for these uses will, it is believed, entirely obviate this objection. Not only is the wood preserved from decay, but it is much less liable to warp and check;

at the same time this treatment must so increase its capacity to resist abrasion, that it will wear much longer.

TELEGRAPH POLES.

In 1860, all Europe had 130,000 miles of telegraph, and at that time the United States alone had more than 50,000 miles. It is doubtless safe to estimate the present aggregate length of all our telegraph lines at 60,000 miles. If we allow forty poles to the mile, it will be perceived that 2,400,000 poles are required for the lines already existing in this country. The average cost of these—including the labor of preparing and putting them up—may be estimated at five dollars each, or $12,000,000 for the whole number now in use. More than double that number of poles is required for the existing lines in Europe, where they are presumed to cost more than in this country. From these facts and estimates we are authorized to conclude, that the amount of capital invested in telegraph poles in Europe and the United States is not less than 40,000,000 of dollars. If we assume that they will last twelve years (this is not probable), the annual cost of replacing the decayed ones is more than 3,000,000 of dollars, which may be saved by subjecting telegraph poles to treatment under the Robbins patent.

BUILDING OF SHIPS.

Under this head we comprehend all ships, steamers and boats of every description, employed in the navy, and for the transportation of passengers and merchandise in the commercial and international intercourse of the world. The importance of rendering wood indestructible, at least in a qualified sense, for the purposes here indicated, cannot be

too highly estimated. The vast sums expended in naval architecture, and in the whole merchant marine of all nations, are now measurably thrown away on account of the perishable nature of the materials employed. Before the late war, some of the vessels intended for our navy decayed on the stocks, or were damaged by worms to such a degree that it became necessary to replace many of the timbers before these structures were completed. The builder scarcely kept out of the way of the destroyer. Our mechanical industry is sacrificed when we have only perishable and worthless memorials of its greatest achievements.

The loss in consequence of this rapid decay is so great, that if it were in our power to submit accurate estimates of the same, the figures would astonish the whole community. Not only is this great loss unavoidable, so long as we use timber that has simply been prepared by the ordinary process of seasoning, but incalculable wealth, in the shape of merchandise, goes to the bottom of the ocean, every year, merely because our merchant vessels and steamers have been so far impaired, by the decay of some of their timbers or otherwise, that they give way, and the whole fabric goes to pieces amidst the strife of the elements. Thousands of lives are also lost from the same cause. This fearful destruction admonishes us that the timbers of which we build our ships of war, foreign packets, merchant vessels, life-boats, etc., should be made of materials that are water-proof, worm-proof, and, if possible, time-proof. Not only does the Robbins process preserve the wood from the destructive powers of oxygen and moisture, and from the ravages of the *Teredo Navalis*, in the most perfect manner possible, but this treatment by oleaginous compounds likewise prevents the corrosion of the metallic bolts, spikes and nails, employed in the construction of all such works.

BURIAL CASES.

The common desire we all feel to preserve the remains of the dead has led to the extensive use of metal cases instead of coffins made of wood. These are not only expensive, but they soon corrode, and it is questionable whether the best of them will last longer than twenty or thirty years. It is believed that wood thoroughly treated under the Robbins patent will last a century in the ground. The cases found in the tombs of Egypt, where they have remained for 3,000 years, are generally in a good state of preservation. It is well known that these cases were prepared with bituminous substances, and that the same were used with the pyroligneous acid of wood in the process of embalming their dead.

We have, in the extreme Southern portion of our country, large quantities of perishable wood (cotton-wood and other soft varieties) which may be made available by the application of this treatment, in the construction of railroads and for other purposes. In Mexico and South America—where the ordinary decay of wood is more rapid than in more northern countries—it is believed that a great market may be opened for the sale of railroad timber and other lumber, provided the same be rendered durable by the treatment, herein proposed.

FROM THE SCIENTIFIC AMERICAN.

THE ART OF PRESERVING WOOD.

Wood is an article of prime necessity and stands foremost in its connection with every conceivable interest within the range of civilization. Millions of men and unlimited capital are daily employed in converting wood and lumber to the innumerable and necessary uses required for human comfort. So great is the demand for lumber in the progress of the arts and civilization, that our native forests, which so recently covered nearly the whole of the Eastern and Middle States, have been brought into requisition and removed, except small portions at great distances from market or situated in almost inaccessible localities. The increase of our population and the improvements in the arts, generally, have been so rapid, that even now it is a serious problem as to where we are to obtain our future supply of wood and lumber.

Notwithstanding wood is so intimately and extensively connected with all the various interests of human progress, and the vast and unlimited means devoted to its conversion from its condition in the forest to its ultimate uses, it cannot have escaped, even the most casual observer, that it is, nevertheless, an article subject to rapid and useless decay. It is a no less important fact that wood occupies a place that cannot be supplied by all the other resources of nature aided by human invention.

It now becomes a matter for serious inquiry whether we cannot accelerate the growth of wood or preserve it from decay. Indeed, this has long been a subject of most earnest inquiry and deep concern in countries of an older civilization than our own; and within the last thirty years the inventive genius of man has been taxed to devise means by which so desirable a result could be obtained as the preservation of wood. In view of the immense expenditure of time and capital, devoted to fashioning and adapting wood to the various forms and uses required, it is obvious that no greater achievement can be made in the useful arts than the effectual preservation of wood from decay, and the saving of the vast annual expenditure required in removing the things which the elements have destroyed, and in supplying new materials and structures in their place.

Out of the great number of inventions and patents made and obtained for this purpose, one invention—that for which Bethell obtained Letters Patent in England in 1838—has demonstrated the fact, that by the use of oleaginous compounds, obtained from the distillation of coal tar, properly applied, wood can be preserved for an indefinite length of time.

The following named inventions and patents, made and granted in Europe, are referred to for the purpose of showing some of the means which have been resorted to—without substantial success—to obtain this desirable result; and also to afford such information to the public as will guard it against any ex-

penditure of means with a view to the introduction of such processes in this country.

Kyan's process for preserving wood was the first to attract general attention. It was introduced in 1832, and subsequently patented in this country. The process consists in saturating the wood with a dilute solution of corrosive sublimate. This method, always too expensive to admit of general application, has been wholly abandoned in this country.

In 1837, one Margary obtained a patent in England for preserving timber by immersing it in a solution of acetate or sulphate of copper. After being thoroughly tested in England this process has gradually yielded to other processes.

In 1838, Sir William Burnett's process was patented, and since that time Burnettizing wood has been practiced in Europe and America. In this process the wood is saturated with a concentrated solution of the chloride of zinc. While Kyan's discovery failed of being widely adopted, from the fact that the material employed was too expensive to admit of being generally used, Burnett's process, for a similar reason, has only been employed to a limited extent.

Payne's process was patented in England in 1841. He employed two solutions, successively, which naturally decomposed each other, forming an insoluble substance in the pores of the wood. The earthy or metallic solution is first introduced into the timber, under pressure; after which the solution is drawn off and the decomposing fluid forced in. Sulphate of iron and carbonate of soda are said to form the insoluble compound in the pores of the wood. This process has been tried in England and this country, and has met with some favor in France.

Dr. Boucherie, a distinguished French chemist, invented a process for preserving wood, and for which he procured a patent. It is claimed that this process accomplishes two objects:—First, it expels the sap; and secondly, it fills the pores of the timber with a preservative solution. The fluid that is alleged to preserve the wood is so introduced by pressure that it "passes longitudinally along the fibers," thus expelling the sap and occupying its place. The claims of this process are being urged in this country under the false pretence that it is a new discovery.

Bethell—by his process patented in England in 1838—rendered wood more imperishable by the use of a cheaper material; but his machinery was unnecessarily complicated, and his method of conducting the process quite imperfect and too expensive to admit of general application. We extract the following partial description of Bethell's process from a small treatise on the art of preserving wood, published in this country in 1859:—

"It consists in impregnating the timber with an oily matter obtained from a rough distillation from coal tar. This oily matter contains a variety of substances, having different chemical properties; one of the essential ingredients for this purpose is said to be creosote, which forms, as estimated, about thirty per cent. of the product of distillation used for this purpose. The other in-

gredients have a no less important effect. The oily matter is injected into the timber by pressure in closed vessels, from which the air is first partially exhausted."

The subjoined letter from Dr. Dwinelle, who personally witnessed what he describes, is sufficiently explicit, in respect to Bethell's machinery and process.

"Louis S. Robbins,—*Dear Sir:* I cheerfully comply with your request to give you such information as I obtained in Europe, several years ago, in regard to the use of *coal tar* and its products as a means of preserving wood.

"In 1852, while investigating different matters of public interest in London, I was invited by Mr. Burt to visit his extensive works on the Surrey side of the Thames, where he had, for several years, been treating—for the English and India markets—large quantities of wood with products of coal tar, according to a process patented by Mr. Bethell in 1838.

"His process consisted in placing the wood or lumber in a large iron cylinder, constructed expressly for the purpose, and made very strong. When these cylinders were sufficiently charged with wood—it being carried into them on cars constructed for the purpose—the ends were closed in such a manner as to render them perfectly tight, the air and moisture were then exhausted, as nearly as possible, by air pumps attached to the apparatus for that purpose, Then other pumps were employed to force the liquid product, that had been obtained by distillation of coal tar, into the cylinders, which was continued until a pressure of 150 lbs. to the inch was reached. After a certain time had elapsed, the wood was taken out of the cylinders and placed in a suitable position for drying, when it was ready for use.

"The machinery employed for these operations was both complicated and expensive, and so imperfect, in respect to its capacity to produce the result desired, that a large amount of time was required to saturate the wood to any considerable extent, or in a degree sufficient for the purpose of its preservation. This method, however, was considered the best then known, and had been proved to be a success for many years, by the practical use of the wood thus treated.

"Bethell's process seemed to be very objectionable, not only because it required much time and labor, but also for the reason that it was only suited to the treatment of lumber to be used for the most ordinary purposes, such as railroad sleepers, piles for wharves, bridges, etc., etc.

"I have carefully examined your patented process. It appears to be simple, rapid and inexpensive, and much more perfect in its results than Bethell's, inasmuch as the hot oleaginous vapors arising from the distillation of the coal tar must, under the circumstances, permeate every portion of the wood or lumber to any extent required.

"Your process is open to none of the objections urged against Bethell's plan, since, by its use, wood may be rapidly and properly treated for all the various uses to which wood is applied in the mechanic arts. Moreover, the

fact that you use the same material leaves no doubt as to the success of your patent, it having long since been practically established in Europe, that the products obtained from the distillation of coal tar, if properly applied to wood, will preserve it for a great length of time from decay, and also from destruction by marine and other insects. Truly yours,

"WM. H. DWINELLE, M. D., No. 119 Tenth Street, New York."

The great value of Bethell's discovery has been so clearly demonstrated, by the uniform results of its application, that scientific men in Europe, and especially the most distinguished engineers in England, have come to entertain but one opinion of its merits. It can hardly be necessary to multiply authorities in this connection, since the following emphatic testimony—extracted from Dr. Andrew Ure's "Dictionary of the Arts," must satisfy the most skeptical reader. Treating of the results of Bethell's process he says:—

"The effect produced is that of perfectly coagulating the albumen in the sap, thus preventing its putrefaction. For the wood that will be much exposed to the weather, and alternately wet and dry, the mere coagulation of the sap is not sufficient; for although the albumen contained in the sap of the wood is the most liable and the first to putrify, yet the ligneous fibre itself, after it has been deprived of all sap, will, when exposed in a warm, damp situation, rot and crumble into dust. To preserve wood, therefore, that will be much exposed to the weather it is not only necessary that the sap should be coagulated, but that the fibres should be protected from moisture, which is effectually done by this process.

"The atmospheric action on wood thus prepared renders it tougher, and infinitely stronger. A post made of beech, or even of Scotch fir, is rendered more durable, and as strong as one made of the best oak, the bituminous mixture with which all its pores are filled acting as a cement to bind the fibres together in a close tough mass; and the more porous the wood is, the more durable and tough it becomes, as it imbibes a greater quantity of the bituminous oil, which is proved by its increased weight. The materials which are injected preserve iron and other metals from corrosion; and an iron bolt driven into wood so saturated, remains perfectly sound and free from rust. It also resists the attack of insects; and it has been proved by Mr. Pritchard, at Shoreham Harbor, that the *teredo navalis*, or naval worm, will not touch it.

"Wood thus prepared for sleepers, piles, posts, fencing, etc., is not at all affected by alternate exposure to wet and dry; it requires no painting, and after it has been exposed to the air for some days, it loses every unpleasant smell.

"This process has been adopted by the following eminent engineers, viz.: Mr. Robert Stephenson, Mr. Brunell, Mr. Bidder, Mr. Brathwaite, Mr. Buck, Mr. Harris, Mr. Wickstead, Mr. Pritchard, and others; and has been used with the greatest success on the Great Western Railway, the Bristol and Exeter Railway, the Manchester and Birmingham Railway, the North Eastern,

the South Eastern, the Stockton and Darlington, and at Shoreham Harbor; and lately, in consequence of the excellent appearance of the prepared sleepers, after three years' exposure to the weather, an order has been issued by Mr. Robert Stephenson that the sleepers hereafter to be used on the London and Birmingham Railway are to be prepared with it before being put down.

. . . . . .

"For railway sleepers it is highly useful, as the commonest Scotch fir sleeper, when thus prepared, will last for centuries. Those which have been in use three years and upward, look much better now than when first laid down, having become harder, more consolidated, and perfectly water-proof; which qualities, combined with that of perfectly resisting the worm, render this process eminently useful for piles, and all other woodwork placed under water."

It is stated by the best authorities, and confirmed by ordinary experience and observation, that the decay of wood is due to the action of oxygen and moisture; and we find that in proportion as it is excluded from these destructive agents it retains its durable and substantial qualities. It would seem that the direct effect of these elements is to remove the antiseptic principles of the wood, and afterward to permeate its substance with moisture, thus softening its fibrous portions and producing mold or decay.

From this brief statement it will be obvious that to preserve wood it must, in some way, be protected from the action and influence of these decomposing agents. In its growing state, wood has all the elements of self-preservation; and, if undisturbed, it will continue to live and grow without decay during the natural period of its development. When a limb is broken, the bark removed, or an abrasion made, so as to expose the circulating fluids to the action of the elements, then decay commences—this fact is patent to all observers.

All growing wood has an oleaginous covering, which protects the fluids from the elements, but when wood is cut down and the oily supply for the surface can no longer be obtained from the soil, artificial means must then be employed that will fully protect the wood from the influence of oxygen and moisture. Oleaginous compounds, such as are obtained from the distillation of coal tar and similar substances, are adapted to this purpose; and they can be applied to wood in such a manner as to preserve it for an indefinite period. This is what is accomplished by Mr. Robbins' patented process hereinafter described. The oily products obtained from the distillation of bituminous substances are not decomposed and destroyed by the action of oxygen and moisture at ordinary temperatures. Hence, when they are properly applied to wood they must protect and preserve it.

It appears to have been the leading idea with all the European inventors, if we except Bethell, to deprive wood of some of its important constituents and essential properties, or to otherwise change them by chemical action. In this, they not only disregarded the common experience of all ages, but they were at war with Nature. The common mistake among them consisted in attempting to produce a condition of wood that is wholly unlike its living state,

instead of restoring to it what had been lost by time and exposure to the elements. Moreover, while the materials used actually destroyed the native integrity of the wood, they were of far too costly a nature to admit of general application. For these reasons the several processes of Kyan, Margary, Burnett, Payne and Boucherie, will ultimately be regarded as failures, practically and in every essential sense.

Very different will be the public verdict respecting the claims of Bethell's discovery. How far he really comprehended, or even perceived the principles which the subject involves, we may not be able to determine; nor is this important in estimating the value of what he accomplished. It is manifest that his course of experiment was in the right direction. He sought to preserve, by artificial means, the vitality of Nature—to prevent the loss of those constituents and properties which are essential to wood in its normal and undecaying state. To him belongs the credit of originality, and of furnishing the potent suggestion which has enabled Mr. Robbins to complete a discovery second to no achievement in the useful arts, in the universality of its application, and in the consequent magnitude of its practical results.

Hitherto we have discovered nothing that will so effectually resist moisture as oil. It is not only a demonstrated fact in science, but it has become a proverb everywhere, that oil and water have no affinity—that they will not unite. While water finds its way through the closest animal tissues and into the hardest wood, and, by mechanical pressure, may even be forced through the solid metals, this antagonism between oil and water is universal and irresistible. This suggests the immense value of oil in the preparation of all durable fabrics and manufactures of wood that are required to be impervious to moisture. In all civilized countries, and back through the entire historic period of the world, men have acted on this suggestion; in the preparation of the skins of animals for shoes and for other purposes; in the manufacture of various outside garments; in painting their dwellings, ships, fences, furniture, and all the other superstructures of wood. These are rendered durable by the proper application of oil, and in proportion as the oil so applied is of a nature suited to endure the action and influence of oxygen and moisture.

The vegetable and animal oils differ essentially in their constituents from the oleaginous compounds derived from bituminous substances. The difference in their inherent capacity to resist moisture is equally marked and no less deserving of notice. The exposure of the former to the action of the elements gradually diminishes this power of resistance. Heat brings the organic oils to the surface of whatever they are applied to, and some of them are soon dissipated so that they no longer afford a sure protection. But it is not so with the products of coal tar, or with the bituminous oils. These, instead of being dissipated in part, or otherwise impaired by the ordinary changes of temperature and the varying degrees of moisture, become resinous from exposure, and hence the substances to which they are applied become harder and more durable by time. It is the unqualified testimony of Dr. Ure that railroad sleepers,

that had been in use for more than three years, "looked much better than when first laid down."

At the time we write corrosive sublimate is worth one hundred and thirty-five dollars per one hundred pounds, while chloride of zinc is still more expensive. The preparation of railroad ties, by the use of such materials—if we allow one pound to a single tie—would cost not less than one dollar and a half each, while the cost of a far more effectual treatment, by the products of coal tar, would scarcely exceed ten cents. In the treatment of railroad ties and the timber for bridges and wharves, acids and alkalies are especially objectionable because they corrode the iron bolts and spikes, and thus impair and ultimately destroy the wood with which they are in contact. If copper nails and sheets be employed, as in covering the hulls of vessels, the corrosion must be more rapid when such substances have been employed in the preparation of wood. On the contrary, oil prevents this corrosion of the metals, and in this respect it contributes essentially to the inherent durability of any structure that may be made of such composite materials.

SPECIFICATIONS OF THE ROBBINS PATENT.

To All Whom it may Concern :—Be it known, that I, Louis S. Robbins, of the City, County and State of New York, have invented a new and improved process for preserving wood from mold or decay; and I do hereby declare that the following is a full, clear and exact description thereof, which will enable those skilled in the art to make and use the same, special reference being had to the accompanying drawings, forming part of this specification.

It is a well-known fact, that wood, when cut down, and separated from the roots which supply it with its antiseptics, immediately becomes affected by exposure to the heat and the moisture of the atmosphere; the former of which rapidly dissipates the fluid or sap of the wood, while the latter impregnates the woody fibres with substances which the wood, while growing, by its antiseptics, entirely excluded. These alternate actions upon the wood gradually and finally cause it to decay. To prevent this decay of wood is, therefore, the object of the present invention, and this object is accomplished thereby. The method consists in subjecting the wood to a preservative process by which nearly all of its antiseptics are retained within the same; and for those lost, supplying such substances as will prevent their further waste; at the same time closing the pores and forming such a combination with the fibres of the wood as will effectually prevent the deteriorating effects of either heat or moisture at ordinary temperatures, or of both upon the same, as hereinbefore alluded to.

Many processes have been heretofore invented for the preservation of wood, some of which were entirely impracticable, while others were only partially successful; but by none could the wood be sufficiently impregnated or satu-

rated with the preservative compound, to insure its preservation for a great length of time, owing to the manner in which the same was applied to the wood.

One form of apparatus for carrying out my improved process is represented in the accompanying plate. A, in the drawing, represents a retort, made of any desired form or size, in which coal tar, resin, or oleaginous substances or compounds are placed, and subjected to the action of heat from any suitable furnace. B represents the man-hole in the upper portion of the retort, used in cleansing the same or in changing its contents. C C, a pipe communicating with retort A, at or near its top, passing to, and communicating with, chambers or receptacles, D. E represents the discharge pipe, employed for removing the remaining contents after the operation is over.

Heat being applied to retort A, containing the coal tar, etc., as described, oleaginous vapors are generated therein, which pass out of the same through the connecting pipe, C C, into the wood chambers, D, or into only one of the same as may be desired. The heat thus applied first causes the surface moisture of the wood to be removed therefrom, taking the form of steam and condensing on the sides of said chamber, from which it is drawn off through pipes, H, which may be placed in or near the bottom.

Having thus removed the surface moisture from the wood, I then thoroughly impregnate and saturate it through all its pores and fibres by the oleaginous vapors and heavier products of the distillation, until it is made impervious to moisture, and so as to entirely resist the action of the atmosphere, when it may be removed from the chambers, D, through the doors, M M; when the chambers are again to be charged with wood, and so on as long as may be desired.

In the operation of my process, a temperature of from 212 deg. to 250 deg. Fahrenheit is sufficient to remove the surface moisture from the wood; but to saturate the same with oleaginous vapors and other products, it is best that the temperature should be raised to 300 degrees Fahrenheit, or higher if necessary.

From the above description, it is apparent that, by my process, I am enabled to more completely saturate the wood with the preservative compound than has been, or can be done by any of the processes heretofore in use; for the reason that I cause the preservative compound to permeate the pores and fibres of the wood, in a vaporized state, while in the others it is made to enter in a liquid state; and it is also evident that it is accomplished in an economical, expeditious, effective and practical manner.

I do not intend to limit myself to any particular form of apparatus; nor do I intend to limit myself to the removing of the surface moisture from the wood by means of oleaginous vapors, as herein described, as there are various ways in which the same can be accomplished with the use of heat. But what I do claim as new, and desire to secure by Letters Patent, is:

The process herein described for preserving wood from mold or decay, the same consisting in first removing the surface moisture from the wood, and then

charging and saturating the same with hot oleaginous vapors and compounds, substantially as described.

Also removing the surface moisture from the wood by means of hot oleaginous vapors, substantially as herein described.

LOUIS S. ROBBINS.

Witnesses:
M. M. LIVINGSTON,
ALBERT W. BROWN.

It will be perceived, from an examination of the foregoing specification, that Mr. Robbins' method of treating wood possesses great advantages over even that of Bethell. Indeed, it will be obvious, on a moment's reflection, that his process must be far more rapid and complete. For while Bethell employed his oleaginous compounds in a liquid state, Robbins uses the same materials in the form of vapor, in which condition they are sublimated to a degree which is eleven hundred times finer than they are in the state in which Bethell employed them, and, of consequence, so much the more penetrating. In this state of extreme attenuation, the elements which preserve the wood are more readily admitted—the capillary action being greatly accelerated and made to thoroughly permeate the entire structure of the wood. At the same time the hot vapor opens the pores and expands the wood, so that a larger quantity of the oily compound is admitted. The pores being thus filled, the contraction which naturally results from the cooling process, seals them, if possible, in a still more effectual and lasting manner. The vast superiority of the Robbins process, as compared with that of Bethell, can only be fairly estimated by those who realize the immense difference between the effectiveness of water and steam in their relations to chemical action and mechanical force.

But we should fail in our attempt to comprehend the full value of this improvement were we to overlook other important considerations. It is to be observed that this process renders light and porous wood as solid and durable as the finest grained timber, and perhaps equally well adapted to all ordinary purposes in the arts. In fact, it may admit of a question whether the most porous wood may not be made to last even longer than the wood that is least so, from the fact that it absorbs a greater quantity of the material on which its preservation is made to depend.

Wood, treated by the Robbins process, requires no paint as a means of protecting it from the ordinary action of the elements. Paint is, therefore, useless except for ornamental purposes; and even then, so much of it as is required to fill the pores is saved when the wood has been previously treated by this method, and this saving will doubtless cover the cost of the most effectual treatment under the patent.

It is, moreover, important to observe that this process seasons the wood most effectually; and inasmuch as it thoroughly protects it from the influence of moisture, it follows that wood so prepared is neither liable to swell, shrink, warp nor crack.

A just estimate of this last and most perfect process for preserving wood might suffice to startle every thoughtful man in the community. Experience proves that to ensure the traveling public against accidents, resulting from decayed railroad sleepers, the whole should be removed at least once in five years. The present cost in the Middle States is seventy-five cents each; and it will be safe to assume the average price to be fifty cents throughout the entire country. Add fifty cents each to this, as the probable cost of removing the old sleepers, putting down the new, and replacing the rails, and it will be perceived that every new sleeper that is supplied involves an expense, in material and labor, of one dollar. As railroad ties are placed at an average distance of about two feet, it follows that 2,500 are required in a single mile. Hence, it costs about twenty-five hundred dollars ($2,500) per mile to remove the old sleepers and lay down the new ones. As there are fifty-thousand miles of rail tracks in the United States, it will appear that $125,000,000 are demanded to support the rails of all the roads in the country.

These figures indicate the enormous expense of a single renewal of the sleepers of all our railroads. If thus renewed once in five years, the inevitable cost, in the next twenty-five years, of the new ties for the roads already constructed will amount to 625,000,000 of dollars! Now, it being demonstrated that sleepers, prepared by the process already described, will last a quarter of a century, the conclusion is inevitable, that the universal application of the Robbins process, to the ties of all our roads, would involve a saving—after deducting the cost of their preparation under the patent—of some 450,000,000 of dollars. Moreover, if the progress of the construction of such roads, for the next twenty-five years, should continue to be, at the rate it was during the six years next preceding the late rebellion (2,000 miles per annum), the saving of money in railroad ties, and in the labor of laying them down, would not fall much short of 700,000,000 of dollars!

But the complete contrast between the Bethell and the Robbins processes requires the presentation of another important feature. The wood prepared by Bethell was only fit for timber that was fashioned and adapted to the rudest forms and uses, such as railroad ties, the piles for bridges, wharves, &c., for the reason that the surface was left covered with the grosser products of coal tar. But as the Robbins process applies the same in the form of vapor, the wood is left clean; and after a few hours' exposure to the air, it is fit to be handled and used for any purpose in which elegant workmanship is required.

Apart from mere pecuniary considerations, the preparation of railroad timber by this process is immensely important as a means of safety. A large number of railroad accidents occur in this country from the rapid decay of the sleepers. This is, of course, unequal, some of the ties rotting and giving-way, while others remain in a sound state. This causes an oscillating and irregular motion of the cars, which sometimes throws the train off the track; it also occasions an unequal pressure on the rails, which are liable to break. The violent motion, resulting from the uneven surface of the track, causes unequal friction,

and an undue strain on the axles, and on the flanges of the wheels, the breaking of which constitutes another prolific source of railroad disasters.*

The direct loss to our railroad corporations, in the destruction of property by such accidents, is very heavy; but it would be quite impossible to compute the still greater loss that is indirectly sustained. The fact cannot be disguised that the seeming indifference of railroad companies to the public safety has the effect to greatly diminish the travel. Multitudes who would make frequent excursions for pleasure but for a feeling of insecurity, now only venture from home when the pursuits of business or other circumstances imperatively demand it. Beside, if the distance be short, many persons use a conveyance of their own, when they might travel by rail at less expense of both time and money. It is a false economy that refuses to accept and apply a great improvement when once it is demonstrated to exist; and our railroad directors, must be made to feel that it is even criminal to disregard such a discovery when it is known that the public safety demands its immediate adoption.

We have only estimated the value of Mr. Robbins' process for preserving wood in its relation to a single use. And yet, wood is the chief material employed in the world's navies and merchant marine; in the construction of our dwellings, workshops, warehouses, carriages, fences, agricultural implements, and household furniture. The millions require it in fashioning the implements of toil; three-fourths of the products of the earth, and of all human industry, are inclosed in wood for preservation or transportation; the masses, in all countries, warm their dwellings and cook their food by its combustion, and the whole vast commerce of the world still rides on every ocean and sea in vehicles of wood.

The new process is equally applicable to wood in all its uses except for fuel. But we have no data from which a reliable estimate can be made of the immense saving which would result from its universal adoption.

THE SCIENTIFIC ASSOCIATION ON WOOD PRESERVING.

S. B. BRITTAN, M. D., member of the New York Association for the Advancement of Science and Art, some time since read a carefully prepared paper, on the History and Philosophy of Preserving Wood, before the Engineering Section of that body. The following is an extract from Dr. Brittan's paper, which appeared, *in extenso*, in one of the daily journals:

There are several processes, natural and artificial, whereby wood—at least the insoluble portion of the same—may be preserved for an indefinite period. When the oily and resinous matter, and all the volatile products of wood are

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* The great destruction of life by railroads in this country is rapidly becoming a cause of national reproach. It is well known that railroad accidents are far less numerous in Europe than in this country. Nor is the comparative infrequency of such disasters in England, France and Germany, altogether attributable to the superior construction of their railroads. It is due in no small degree to the fact that their railroad ties are subjected to some process which renders them less liable to decay.

removed by a slow combustion, the carbon remains in the form of charcoal. This is a very poor conductor of heat, and a powerful antiseptic; exposure to air and moisture does not materially change its condition; and hence it will not decay. Carbon in this form is well nigh imperishable, except by combustion; while in the pure, crystalline state, it can only be destroyed by the application of heat sufficiently intense to consume the diamond. Piles, posts and stakes are often charred on the surface to preserve them from decay. Men who follow the sea likewise char the outside of casks and tanks by which means the water contained in them is kept cool and pure during long voyages into tropical regions. Whenever—by other means than combustion—the soluble matter is expelled, only the lignine, or fibrous portion of the wood remains, and this is quite imperishable, except when it is attacked by parasitic fungi. In this case the effect becomes visible in the *dry rot*, which gradually destroys the organic structure and the cohesion of is elements.

We have other conditions of certain constituents of wood, in which they are indestructible by the ordinary action of oxygen and moisture. These conditions are found in the carboniferous formations and bituminous deposits in the earth, which are doubtless the products of extinct vegetation, formed by immense pressure and the action of volcanic fires—resulting in vast condensation; and, in respect to the coal beds, the dissipation by heat, and expulsion by pressure or otherwise, of the fluids and gases from the subterranean forests.

Resinous substances preserve wood and other organic forms of matter. A pitch pine knot will last for a century—buried in the ground—preserved by the common resin it contains. The fossil resins may also be used to preserve both vegetable and animal substances. The ancients were as familiar with these facts as the moderns. It is said that the temple of Diana at Ephesus was built on piles, which were found—within the last century—to be in a state of perfect preservation, the surfaces of the same having been charred and otherwise treated to render them imperishable. The early Greek historians speak of the uses to which asphaltum was applied; and we learn from Pliny and others that the Egyptians employed this substance and the pyroligneous acid of wood in the process of embalming their dead.

The scientific philosophy of the Robbins process for preserving wood may be briefly suggested in this connection Albumen is the constituent in wood which first decomposes; and herein the process of decay or putrefaction commences, and proceeds until the woody tissue is destroyed. But the albumen in the sap is coagulated by the application of heat, and also by the antiseptic power of creosote which the oleaginous vapors deposit in the cellular tissue. Coagulated albumen is insoluble in water, and hence it is not liable to be changed by exposure to a humid atmosphere. The essential oil, disengaged and vaporized by distillation, preserves the elasticity of the ligneous fibre of the wood, and protects it against injury from the ordinary vicissitudes of temperature and moisture. When wood has been treated by coal tar, or the bituminous oils, it undergoes a certain other change from subsequent exposure to

the air. The essential oil loses a portion of its hydrogen, at the same time it takes up an extra portion of oxygen from the atmosphere, and hence becomes *resinous*.

That the antiseptic principle derived from coal tar—in the Robbins process—is readily introduced into and through both animal and vegetable substances, must be obvious. The process of curing meat furnishes a familiar illustration. One has only to taste of a smoked ham to find that the creosote has found its way to the center. The metallic salts likewise have the effect to separate the albumen from its aqueous solution, thus preserving it from putrefaction. The albumen and gelatine of animals when combined with tannin also form insoluble compounds, and thus the skins of animals are made to resist the agents which would otherwise produce a putrescent state. Morever, by the intimate combinations thus formed we account for the antiseptic properties and effects of corrosive sublimate and chloride of zinc as applied to the preservation of wood, in the processes employed by Kyan and Sir William Burnett.

In the Robbins process the surface moisture is soon dissipated by heat, and the wood is thus partially seasoned. The more volatile oil first passes off, entering the open pores—not less than two or three thousand in number to each and every inch of surface. It is well known that the capillary action is greatly increased by heat; and the oleaginous compound—in a state of the greatest possible attenuation—is rapidly diffused through all the substance of the wood. By increasing the heat, the heavier products arising from the distillation are made to thoroughly permeate the woody tissue, and at last to close up the capillary tubes, leaving the entire surface of the wood impervious to moisture.

The great importance of this treatment is so fairly established by the results of Bethell's experiments, and the experience of more than a quarter of a century, that Dr. Andrew Ure affirms that, "the commonest Scotch fir sleeper, when thus prepared, will last for centuries."

A GREAT EVIL AND THE REMEDY.

We extract the following from a leading editorial that appeared in the Hartford (Conn.) Daily *Times*, of the date of September 29th, 1865:

The increasing frequency of railroad disasters, accompanied by a frightful destruction of human life, is exciting general apprehension, and calling attention to the best means of guaranteeing the traveling public against the recurrence of such accidents. We are persuaded that a thorough investigation into the causes of railroad disasters would clearly demonstrate the fact that a large number result from the decay of railroad ties and the destruction of the piles of bridges by marine worms. Experience has proved that the ties or sleepers of railroads only last about five years. The precise time, of course, varies according to the varying degrees of inherent durability and the vicissitudes

resulting from unequal exposure to the elements. The decayed timbers are only removed when, by a superficial inspection, they are discovered. The surface may, however, present a fair appearance when the substance is chiefly wasted by the process of decay. At length the rotten sleeper yields to the heavy pressure; a rail breaks, and away goes the train, freighted with living beings, to sudden and almost certain destruction. It is certain that a long chapter of terrible accidents may be justly ascribed to this cause, and that the breaking of a rail is far more likely to occur in consequence of the giving way of the sleeper that supported it than from any flaw or other defect in the iron.

It may be said that the proper functions of the public press, in its relation to a subject of this nature, are but half performed when the attention of the community is arrested by the fearless exposure of a great evil. Its next duty is to discover the means and instrumentalities of reform, and by forcible appeals to the enlightened judgment and moral sense of the community, to *compel their adoption.* And here we may render a public service by calling attention to the new process for preserving wood from decay, for which Mr. Louis S. Robbins, of New York, has recently obtained a patent. The fact that wood may be preserved for an indefinite period, either by the infiltration of a dilute preparation of corrosive sublimate, a concentrated solution of the chloride of zinc, or by covering its surface and permeating its substance with an oleaginous compound, was long since demonstrated in England. But the several processes adopted in Europe were not susceptible of very general application, owing to the imperfect machinery and methods employed, and the heavy expense necessarily incurred in procuring the requisite materials. All of these difficulties are, however, obviated by Mr. Robbins, who virtually restores and preserves the condition of the live wood by a very easy, cheap and rapid process. Railroad sleepers that would otherwise decay in five years, are made to last a quarter of a century; and the whole preserving process, extending to the very center and heart of the wood, is scarcely more expensive than a single coat of paint on the surface.

As the Robbins process prevents wood from either shrinking, warping or cracking, and, at the same time, renders it indestructible by marine worms, it follows that his method is equally applicable to all the uses (its use for fuel alone excepted) to which wood is applied. The vast commercial consequence of such a discovery can scarcely be exaggerated.

In addition to the immense saving of timber—already a matter of increasing interest and vital importance to the country—the formal use of this process would inevitably save a very large proportion of the mechanical labor and productive industry of the world, by the quality of superior durability thus given to all the artificial structures made wholly or in part of wood. The saving of railroad timber, in this country, would alone amount to some 20,000,000 of dollars annually; and to this sum we must make a further annual addition of not less than forty thousand dollars for every hundred miles of railway that may be constructed hereafter.

The preparation of ship timber by the new process can scarcely be less important than the application of the discovery to railroads. Previous to the late rebellion some of our ships of war were rotting on the stocks before they were finished, involving a loss of both materials and labor. Moreover, not only the tropical seas, but the waters of the temperate zones swarm with marine worms that sometimes destroy the hulls of vessels in a few weeks or months. These worms are liable to attack and riddle the piles of bridges, boring silently beneath the surface of the water, and thus invisibly but surely destroying the integrity of the whole structure. It is a fact that extensive and seemingly durable works are frequently weakened and sometimes wholly destroyed in this way. New Holland was once inundated by these apparently insignificant creatures. Whole villages were made desolate, and 40,000 acres of cultivated lands left a barren waste, the *Teredo Nowalis* (Linnæus) having destroyed the piles of the dyke Leeuwarden. As the Robbins process for preserving wood is said to be a complete protection against the ravages of these omniverous worms, it merits the early attention of shipwrights, the builders of bridges and wharves, and especially of the Navy Department.

At least we may hope that a careful examination of our railroads will soon be instituted, and that the public will imperatively demand the immediate adoption of every new improvement that may afford greater security to the traveling public. If there are railroad and transportation companies that will not promptly employ every means that may tend to the preservation of life, let the selfish and soulless policy of such corporations be freely and fearlessly exposed. Let the people understand that *such roads are traps and snares that lead to death;* and that the manifest crime of their managers is at best constructive homicide. As far as possible let all such lines of travel be abandoned, let the interests of their owners perish, to the end that even licensed criminals may be punished, and human life be respected and preserved.

FROM THE AMERICAN ARTISAN.

PRESERVATION OF RAILWAY TIMBER.

A due regard for the safety of the traveling public requires a careful investigation into the condition of all the railways and railway-bridges in the country. Since the commencement of the late rebellion many of them have not been properly repaired. It requires 125,000,000 of ties for the 50,000 miles of railtracks in the United States. Owing to their constant exposure to the elements, the rapid process of decay renders it necessary to lay down new ones as often as once in five years, at an expense of more than 60,000,000 of dollars. But circumstances growing out of the late war, and the diminished supply and increased cost of the timber, have occasioned a general neglect, the consequences of which are daily more apparent. The directors and stockholders of railways jeopardize human limbs and heads to save the small cost of chestnut logs.

The old sleepers are permitted to remain, to save expense, until one by one they yield to the weight of trains, when a rail breaks, and another chapter is added to the record of human sacrifices.

There is reason to apprehend that the piles of some railway-bridges are perforated in all directions, beneath the surface of the water, by marine worms; and yet no proper investigation is either instituted or demanded. Owing to this neglect, and the decay of railway timber, we may expect that the number of accidents of this class will increase, until the evil finds a violent remedy in exasperated public sentiment.

In the Northern and Middle States the supply of timber is diminishing. Railway ties that once cost thirty cents are now worth double that price, in the same localities; and the facts are such as to occasion apprehension among those who are most concerned in railway enterprises. For obvious reasons, it should be a matter of deeper interest to the public. It is difficult to substitute any other material for many of the uses to which wood is applied. If this cannot be done, and the quantity is likely to be insufficient in the future, then some means should be adopted to prevent the present waste of an article so necessary to the progress of the useful arts. If we cannot accelerate the growth of timber, it is well to consider what may be done to arrest its decay.

As early as 1838 Bethell's process for preserving wood was patented in England. Kyan's method, and the process discovered by Sir William Burnett, attracted attention about the same time. They employed corrosive sublimate and chloride of zinc, respectively, while Bethell covered the surface and filled the pores with an oleaginous compound. The results of these experiments demonstrated the feasibility of preserving wood for an indefinite time; but the methods employed were imperfect; and, if we except Bethell's process, the materials were too expensive for general application. It remained for an American to perfect this important discovery.

Mr. Louis S. Robbins, of this city, has recently patented a new process, in which he employs the antiseptic principle derived from a distillation of coal tar. His machinery is simple, the material employed is cheap, and the process rapid and effectual. As the preservative principle in Robbins' process is the same as that of Bethell, the durability of wood so prepared is demonstrated by Bethell's experiments, and confirmed, by the experience of a quarter of a century.

Since it is assumed that wood treated by Robbins' process will last for twenty-five years, in the most exposed situations, and that this fact is established beyond reasonable doubt by the application of the same antiseptic principle in Bethell's imperfect method, the public should insist on an examination of the claim. If it be well founded, let the rotten timber be replaced by imperishable timber. If durability can be easily obtained, we should insist on having it in the materials of railways. It is also a measure of economy, as well as one that involves the public safety.

ADVERTISEMENT.

In order to facilitate the operations of the National Patent Wood Preserving Company the Executive Committee offer for Sale ***200 SHARES*** of the Stock set apart as working capital.

Persons wishing to purchase can do so by applying to the Officers of the Company.

APPLICATION TO LEVEES.

By recent investigations it has been found that, in the construction of Levees for Southern Plantations, Lumber can be used so as to afford complete protection against the Craw Fish, so destructive to the dykes as heretofore made, and a plan of a modern structure for that purpose has already been invented.

☞ The application of the Robbins Process to the treatment of the wood thus used, will prove to be a source of great profit to this Company.

SPECIAL NOTICE.

Companies formed for the purpose of using, or bringing into use, the Robbins Process for Preserving Wood in Cities, Counties, or States, can purchase the right to do so on the most advantageous terms.

Office of Company,
68 *Broadway, N. Y., Sept.* 1866.